DOCUMENT RESUME

ED 474 736 EF 006 258

TITLE	Guide to Molds at School.
INSTITUTION	Healthy Schools Network, Inc., Albany, NY.
SPONS AGENCY	Educational Foundation of America, Westport, CT.
PUB DATE	2002-00-00
NOTE	7p.; Additional support from Beldon Fund.
AVAILABLE FROM	Healthy Schools Network, Inc., 773 Madison Ave., Albany, NY 12208 ($5). Tel: 518-462-0632; Fax: 518-462-0433; Web site: http://www.healthyschools.org.
PUB TYPE	Guides - Non-Classroom (055)
EDRS PRICE	EDRS Price MF01 Plus Postage. PC Not Available from EDRS
DESCRIPTORS	*Child Health; Cleaning; *Educational Facilities; Hazardous Materials; School Maintenance
IDENTIFIERS	*Molds (Biology)

ABSTRACT

Asserting that molds growing in schools can be harmful to children's health and learning, this guide offers information about the issue. It provides an overview of the basics, then addresses testing, types of molds, molds and health, monitoring schools for mold, mold prevention and clean-up tips for schools, and what parents should do if they suspect mold is making their child sick. (EV)

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Guide To

MOLDS AT SCHOOL

Healthy Schools Network, Inc..

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The Basics

About children. Children may be at special risk from molds at school. Young children's lungs and other organs are still developing and they can't identify hazards. They breathe more air per pound of body weight than adults do; they have hand to mouth behaviors; they rarely stop to wash their hands. While children are *required to be in school,* no laws protect children or even school personnel from exposure to specific molds or specific levels of contamination. Schools are required to provide accessible facilities and programs; children who are extremely mold-sensitive or sensitive to other indoor air pollutants may be eligible for special accommodations. Parents and personnel should be familiar with the symptoms and health effects of mold on children (as discussed on page 3) and monitor children's health.

About school buildings. Molds are everywhere all the time, indoors and out, including in schools. When conditions are favorable, molds will grow above naturally occurring levels. Federal studies have shown that schools are in poor repair and poorly maintained. Many schools have plumbing problems or leaky roofs, which create ideal moisture conditions for molds. Delaying repairs or cutting back maintenance makes problems worse. Many schools have mold problems because of poor construction, or because they are tightly sealed and poorly ventilated, which prevents moisture from escaping. School personnel and parents should be alert to and help monitor schools for moisture, water damage, and resulting mold problems.

Indoor mold growth, mold contaminated buildings, and especially mold contaminated schools have been the topic of an increasing number of news reports and health advisories. To those unfamiliar with the problem this may seem like an odd topic to command so much attention. Yet the public health community and the general public are increasingly aware of the harmful health effects of mold growing indoors, and that molds growing in schools can be harmful to children's health and learning. Most at risk are children and staff who have allergies to molds, or those with pre-existing health problems, such as asthma.

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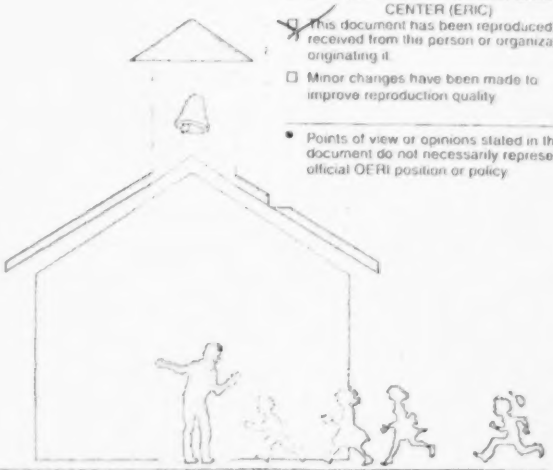
Testing buildings for mold is time-consuming, expensive, and unreliable. No "safe" levels or types of molds have been established. The most important things are: keep the building dry, stop leaks, get rid of mold-contaminated items, fix sources of dampness, and notify the school superintendent when problems are not addressed. Molds will return when dampness returns. The time and money spent on testing can be better spent on cleanup and repairs.



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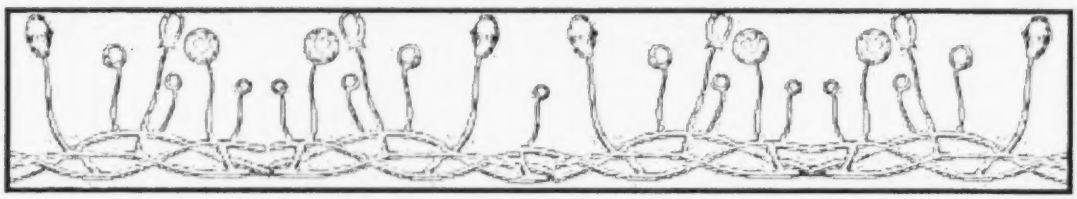
ABOUT MOLDS

Molds are everywhere, all the time. More than ugly, slimy nuisances, growing molds can damage your health and your school. Unfortunately, inadequate maintenance will allow molds to spread on ceilings, behind and on walls, on floors and carpets, and in books and other water-absorbing materials. Molds are a type of fungus. They eat or digest what they are growing on, and they grow colonies by producing long filaments of cells that form visible fuzzy or slimy patches. Molds reproduce by producing spores, tiny particles that can travel in the air and begin new colonies. Molds need two things to live: materials to digest (examples: food leftovers, wood, paper, cloth, wallboard) and moisture (example: water leaks, flooded carpets, wet basements, or very high humidity).

If you see fuzzy, slimy, or discolored surfaces, especially in damp or wet areas, it's probably mold. Molds are often green, black, purple, or orange. An earthy or musty odor, or a smell like alcohol, is often a sign of hidden molds.



"Toxic" molds. Virtually all molds have the potential to affect health, but some have received particular attention because they can release toxic substances called **mycotoxins.** There are many varieties of molds and much more research is needed on health effects. There are no "safe" molds. Here are a few of the more common toxic varieties:

Acremonium: can produce a substance that is toxic if eaten or drunk
Alternaria: often found on carpets, textiles, and window frames in building interiors
Aspergillis: several species produce mycotoxins, including *Aspergillus flavus* found in water-damaged carpets and *Aspergillus versicolor* found on damp wood or wallpaper glue. [1]
Chaetomium: found on substances that contain cellulose (a plant material), such as paper, cardboard, soil, or compost. Also often grows on carpet or between layers of wet plywood.[2]
Cladosporium: often found inside supply ducts.
Fusarium: several *Fusarium* species produce mycotoxins; often found in humidifiers.
Paelimyces: often found in soil and dust, and sometimes in the air
Penicillium: some species produce mycotoxins; often found in paint, compost piles, carpet, wallpaper, and interior fiberglass duct insulation; ex: *Penicillium chrysogenum* and *Penicillium expansum.*
Stachybotrys chartarum (Stachybotrys atra): the best-known "toxic" mold, *"stachy"* is greenish-black and grows on materials that have high levels of the plant material cellulose and low levels of nitrogen, such as ceiling tiles, wood, and drywall.
Trichoderma: often found in paper, as well as unglazed ceramics. It produces antibiotics that are toxic to humans.

[1] Fungi & Indoor Air Quality, from Health & Environment Digest Vol 10, No 2, May/June 1996 McNeel & Kreutzer
[2] http://www.minnesotascience.com/chaetomium.htm,
http://www.uoguelph.ca/~gbarron/MISCELLANEOUS/chaetomi.htm

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MOLDS AND HEALTH

It's a fact: molds can cause serious health problems. But it can be hard to prove a direct relationship between specific molds and specific symptoms. Molds cause different reactions in different people. Students in one mold-infested classroom could have varying symptoms—some could become extremely ill, while others might have only mild, or even no, symptoms. To find out if molds or other types of indoor pollutants are affecting your health, keep a daily log, note when symptoms appear, whether they are worse in certain locations or on certain days. Walk through the school--and your house-- checking for mold or water damage. Tell your doctor.

Common symptoms . Include congestion, runny nose, coughing, and irritated eyes; new or worsening asthma; flu symptoms; headaches and, fatigue. Less common symptoms include fever, vomiting, nausea, nosebleeds, dizziness, memory loss, diarrhea, and changes in behavior. Not everyone has the same symptoms, and some are not bothered at all. Other symptoms may be related to exposure to chemicals produced by molds, including the volatile chemicals that cause moldy odors and chemicals known as mycotoxins. Some molds can cause infections in exposed people whose immune systems are weakened by disease or drug treatments.

Allergies and mold. All molds, dead or alive, can provoke allergic reactions in sensitive individuals. Research shows that people who live or work in very damp, moldy environments can become sensitized due to chronic exposures. Allergic individuals may also develop chronic inflammation. This inflammation then makes people susceptible to secondary bacterial infections. Damp buildings are associated with chronic upper respiratory problems.

Asthma and mold. We are in the midst of a nationwide asthma epidemic that is still not well understood, and some neighborhoods have been hit hard. If your child has asthma, mold at home or school can be an asthma "trigger". If your child encounters difficulty at school, mold growth could be suspect. Recent studies have shown high levels of asthma-triggering molds in some schools. Asthma is the leading cause of school absenteeism due to chronic illness.

Monitoring schools for mold: the walk-through.

A walk-through is a good way to check an entire building. **Look** at the parts of each room. Don't forget to look up—damp ceilings are frequent your school for mold. Don't touch any mold you find. Go through the likely spots for mold growth. Pay special attention to any water stains. Check inside closets and boxes. Look behind furniture, especially if it's leaning against outside walls. If you **smell** a musty, earthy, or alcohol-like odor, it is often mold. It may be necessary for someone to remove a few ceiling tiles or a patch of wall to check. Only trained individuals should do this, wearing protective gear, and controlling the site to prevent spores from spreading to new areas.

MOLD PREVENTION and CLEANUP TIPS FOR SCHOOLS

Fix leaky plumbing, stop condensation, and leaks in the building envelope.

To reduce moisture levels indoors, stop leaks, increase ventilation, and/or dehumidify the air. Schools in damp, humid climates may need to dehumidify the air year-round to prevent mold damage.

Perform regular maintenance on heating, ventilating, and air conditioning (HVAC) equipment. Keep HVAC drip pans clean, flowing properly, and don't block the airflow with books and papers.

Vent damp areas such as janitor's closets, lavatories, shower rooms, pools, and kitchens.

Maintain low indoor humidity, below 60% relative humidity (RH), ideally 30-50%, if possible.

Clean floors and other surfaces frequently and thoroughly, minimizing moisture; use vacuums with multi-stage filtration and a HEPA filter or high filtration disk. (HEPA or high-efficiency particulate air filters prevent very fine particles, such as mold spores, from returning to the vacuumed area from the vacuum cleaner's exhaust.)

Clean and let dry any wet or damp areas or materials within 24-48 hours.

Don't let building foundations stay wet. Provide drainage and slope the ground away from the foundation. Cut back trees and shrubs that are touching the walls; let sunlight and fresh air keep the building dry. For renovations and new construction, keep building materials dry; keep the site dry; and tell the architect to design the building to be easy to clean and to keep dry.

Monitor the building for leaks and dampness; report and fix problems quickly.

Cleanup Tips

❑ Don't use students to remove moldy materials and don't do it yourself!

Does your school have enough custodians to stay current on repairs? If so, the custodial crew can sometimes handle mold jobs. The best way to remove mold-contaminated material depends how much mold is present and where it is. Ask the Department of Health for guidelines, or consult the re-

Waterlogged items Wet vacuuming or hot water extraction may work on items such as carpets or drapes. When dry, they should be dry-vacuumed, using a vacuum with multi-stage filtration and a HEPA filter or high filtration disk. Any porous items that are washed must be dried; if fast drying is not possible, the items should be thrown out. Once ceiling tiles and insulation get wet, it is easier to replace them.

Hard surfaces Areas like walls, ceilings, and uncarpeted floors can usually be damp-wiped, either with water alone or with a solution of water and detergent. (For wood, however, use special wood cleaners.) Scrub. Discard rags or other items used in the cleanup.

Trained staff or contractors? How can you tell? ----- Only people who have been specially trained should remove damaged materials. Contain the remediation area so that spores don't spread. The protective equipment needs will vary according to how extensive the molds are, but the minimum is gloves and eye protection, plus an N-95 respirator that covers the nose and mouth and filters 95 percent of the particles in the air. These respirators are available in many hardware stores.

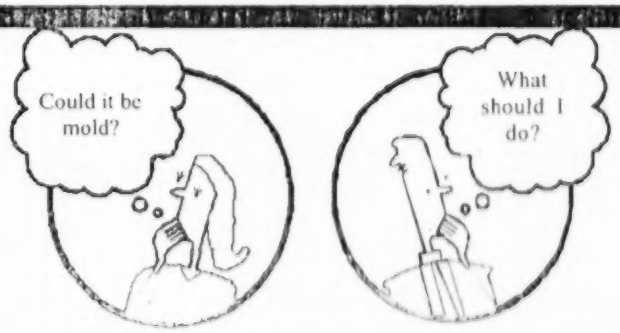
Page Note: "Mold remediation in schools and commercial buildings", United States Environmental Protection Agency, http://www.epa.gov/iaq/molds

SCHOOL MAKES MY CHILD SICK. I THINK IT IS MOLD. NOW WHAT?

School officials. Take health complaints seriously. Timely responses and 'transparent' actions are good for the building, good for the community, help protect child health and learning, and prevent small problems from becoming large headaches.

Parents, personnel. Do you or does your child go to school healthy and come home sick? Has your child complained of "funny" smells at school? Maybe you have noticed the odors, or have seen patches of molds during your visits. First, if you see or smell molds, get them cleaned up. Keep a log or diary of health symptoms. Talk to your family physician. To address the school environment, you will likely need a plan, information and probably more than a little persistence. Since there is no system to protect children, and no laws specifically designed to protect children or employees from molds, your next step is to influence your local school. Here are some recommended steps:

- **Learn more: talk to the facility director, or the health and safety committee.** Call your principal or superintendent. Ask if anyone else has complained about health problems at school. Ask the school nurse how many children are using asthma inhalers. Ask if there is a plan to investigate or to fix the problem. Ask to see a copy of the results of the investigation or the work order for remediation. These are public documents.
- **Put it in writing.** Schools get phone calls all the time. Write a friendly letter to your superintendent, and keep a copy. Let him/her know that a serious child and adult health issue is at stake. Tell him/her about this guide and other resources about molds.
- **Get action.** You don't need to be a mold expert to help your school. If school does not answer your letter or take necessary action, then talk to other parents or personnel. Your parent association or PTA may help; if not, form your own group to push for a healthy school. Let the new group write a letter; it can speak to the superintendent or the board of education. It is your school's job to maintain a safe school environment and to provide accessible programs and facilities.
- **Keep a log.** Keep notes on phone calls, observations, responses from school, other communications, and you/your child's health. **If your doctor agrees that molds or other indoor hazards are affecting you or your child's health at school,** ask about "Section 504" or other accommodations laws designed to guarantee an accessible educational program or workplace.
- **Say thank you.** If school fixes the problem, say thank you. Support the facility budget.



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American Academy of Pediatrics, Committee on Environmental Health. Handbook of Pediatric Environmental Health. Etzel RA, Balk SJ, Ed. Elk Grove Village, IL: American Academy of Pediatrics, 1999.

American Industrial Hygiene Association, http://www.aiha.org, or 703 849 8888. Trade group that can help you find professionals to clean up mold problems. Also produces brochures, including *Guidelines for Selecting an Indoor Air Quality Consultant.*

Ammann, Harrie M., Ph.D., D.A.B.T. Senior Toxicologist, Washington State Department of Health, Olympia, Washington, "Is Indoor Mold Contamination a Threat to Health?" http://www.doh.wa.gov/ehp/oehas/mold.html

California DHS, California Indoor Air Quality Program, http://www.cal-iaq.org/iaqsheet.htmlinks to "Mold in My School: What Do I Do?" a pdf document. This site also has a number of other mold and indoor air related links.

Mann, Arnold, "Mold in Schools: A Health Alert," USA Weekend Online, 20 August 2000. http://www.usaweekend.com/00_issues/000820/000820mold.html/ A good general introduction to the issue of mold in schools.

Minnesota Department of Health, *Recommended Best Practices For Mold Investigations in Minnesota Schools* http://www.health.state.mn.us/divs/eh/aialr/iair/schools/schools.pdf. Although it is written specifically for Minnesota school personnel, this guide contains a wealth of information on dealing with mold in schools that can help parents or officials anywhere. The department's *Investigating Mold in Minnesota Public Schools* (http://www.health.state.mn.us/divs/eh/indoorair/schools/mold.html) is a shorter document summarizing the guide.

National Center for Environmental Health, Centers for Disease Control and Prevention, USD Health and Human Services, *Molds In The Environment.* http://www.cdc.gov/nceh/airpollution/mold/moldfacts.htm

New York City Department of Health, *Facts About Mold. http://*www.ci.nyc.ny.us/html/doh/html/epi/epimold.html. General information on mold as well as sources New Yorkers can turn to for help in identifying or responding to mold problems.

New York City Department of Health, *Guidelines on Assessment and Remediation of Fungi in Indoor Environments.* http://www.ci.nyc.ny.us/html/doh/html/epi/moldrpt1.html Detailed guidance on responding to indoor mold.

United States Environmental Protection Agency, *Mold Remediation in Schools and Commercial Buildings* http://www.epa.gov/iaq/molds. Detailed advice on addressing mold problems in schools.

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For additional guides and literature on school indoor air quality, healthier cleaning practices, elimination of pesticides, disinfectants, health & safety committees, "504" accommodation, renovation hazards, and other issues affecting schools and their occupants.

This guide was made possible with the generous support of
The Educational Foundation of America and The Beldon Fund.

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